Remarks

Status of Claims

Claims 1 – 20 were original in the application. Claims 21 – 25 were added. Claims 2, 3, 5, 6 and 8 – 15 have been allowed. Claims 16 – 20 have been cancelled. Claims 4 and 7 have been indicated as allowable. Claims 2 – 15 are submitted as allowed or allowable. Claims 1, 4, and 7 have been amended. Therefore, claims 1 and 21 – 25 are submitted as also being in allowable condition.

Rejection Pursuant to 35 USC 112

Clerically conforming amendments to claims 1, 4 and 7 have been made.

Claims 1 and 21 – 25 were rejected only on the ground that it was contended that the specification failed to show the formation of masking layers.

It is clear that a siliceous layer is formed on the elastomeric surface. The specification states at page 2 beginning at line 14:

> "The step of decreasing the surface tension of the elastomeric material comprising in the illustrated embodiment the step of **forming a silicon dioxide layer on the elastomeric material**. In particular the silicon dioxide layer is formed on the elastomeric material by sputter

deposing silicon dioxide on the elastomeric material in an argon-oxygen plasma."

"The improvement also comprises the step of **forming a silicon nitride layer on the elastomeric material** by sputter deposing silicon nitride on the elastomeric material in an argon-nitrogen plasma."

"The invention still further comprises the embodiment of decreasing the surface tension of the elastomeric material by **forming a silicon layer on the elastomeric material** by sputter deposing silicon on the elastomeric material in an argon plasma."

It is also clear that the elastomeric layer is photolithographically processed to form a structure. At page 2, beginning at line 11, it states:

"The invention is defined in one embodiment as an improvement in a method of **microfabricating elastomeric material** having a characterizing surface tension. The method comprises the steps of decreasing the surface tension of the elastomeric material and **photolithographically processing the elastomeric material** with decreased surface tension."

At page 6 it states further that:

"This deposition results in **a silicon dioxide layer** which adheres remarkably well to the exposed elastomer surface, and can be used to change the surface tension of the sample surface.

Photoresist can readily be deposited onto this oxide layer by a standard spin-on process for additional processing steps if desire **according to conventional photolithographic techniques**. Conversely, the deposition of silicon dioxide in ArO_2 plasmas can be followed by silicon or silicon nitride deposition in Ar/N_2 plasmas, and the desired number and order of layers can be deposited onto the initial oxide layer **for further processing, such as for metalizations or mask deposition**. "

Hence, as per claim 1, it is clear that silicone elastomer is microfabricated using semiconductor fabricating procedures, including reactive sputter deposition of a layer including silicon on the elastomer to allow for the later formation of masking layers on the layer, which has been sputtered on the silicone elastomer. By this means a structure is photolithographically microfabricated in the elastomer.

In regard to claims 21 – 25 the Examiner contends that directionally etching an elastomeric material in combination with sputter deposition to form masking layers is not disclosed.

At page 3, beginning at line 10, it states:

"The invention is also defined as a method of directionally etching an elastomeric material comprising the steps of providing an RF plasma etching system, creating an oxygen plasma in the presence of Freon in

the RF plasma etching system, and removing silicon tetrafluoride from the RF plasma etching system. "

At page 4, beginning at line 16, it states:

"Fig. 2 is a simplified diagrammatic side view of a plasma etching system **in which the directional etching of an elastomer may be practiced** using an oxygen plasma in an oxygen-Freon mixture."

The process of directional etching of an elastomer is described with some detail beginning at page 6, beginning at line 14 through page 7, line 22, where, for example, the lead-in paragraph states:

"In another plasma fabrication procedure, we have developed a technique necessary to directionally etch the elastomer material. For this process, we use a standard RF plasma etching system and a dry chemical removal procedure to execute the directional etch, which procedure volatilizes all of the components of the polydimethylsilicone (PDMS) or GE's RTV elastomer material. These recipes have resulted in high etch rates and with smooth etched surfaces."

- It is thus clear that directional etching of an elastomer is disclosed.
- From the disclosure cited in relation to claim 1 is also clear that the application discloses sputter disposing a silicon bearing layer on the elastomer.

- It is further clear in the same cited disclosure that conventional photomasks can then be placed on the silicon layer to create patterned structure as with any conventional photolithographic process on silicon. This includes inter alia the conventional definition of masks and of exposed portions through the masks to the underlying substrate, which is notoriously the conventional practice.

However, in this case the underlying substrate is not a semiconductor, but is an elastomer. It is disclosed beginning at page 2, line 4, that it is known in the prior art to chemically etch elastomers using toluene. However, it is noted that toluene is not a directional etchant in an elastomer. The invention, however, discloses in some detail a directional etching practice in elastomer.

Therefore, the application clearly discloses the step of directionally etching an elastomeric material which in turn is comprised of the steps providing an RF plasma etching system, creating an oxygen plasma in the presence of Freon in the RF plasma etching system, and removing silicon tetrafluoride from the RF plasma etching system as set forth in claims 21 and 25. Claims 22 – 24 are similarly supported in each of their details, which are not being questioned by the Examiner.

The specification is concise and relatively short. However, all the paragraphs must be read in combination as being directed to a combined teaching and no paragraph should be understood in isolation of the others in the specification..

Advancement of the claims as amended to allowance is respectfully requested.

Respectfully submitted,

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